

CLAIMS

What is claimed is:

1. A tool assembly unit for coupling a tool and a tool holder, said unit comprising:
 - 5 a measuring device adapted to determine the position of the tool with respect to the tool holder;
 - an alignment device coupled to said measuring device, said alignment device being adapted to receive the tool holder ;
 - 10 a moveable rod slideably disposed on said alignment device, said rod being adapted to be coupled to the tool; and
 - said rod being adapted to move the tool with respect to the tool holder to a desired position as measured by said measuring device.
2. A tool assembly unit as set forth in claim 1 wherein the tool holder defines an aperture for slideably disposing said moveable rod therein.
3. A tool assembly unit as set forth in claim 1 wherein said measuring device includes an optical viewer disposed thereon.
- 20 4. A tool assembly as set forth in claim 3 including a controller coupled to said optical viewer and said alignment device for controlling said rod in response to input by a user.

5. A tool assembly as set forth in claim 3 including a controller coupled to said optical viewer and said alignment device for controlling said rod in response to feedback from said optical viewer.

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6. A tool assembly unit as set forth in claim 1 including a controller coupled to said measuring device and said alignment device for controlling each of said devices.

10 7. A tool assembly unit as set forth in claim 1 including a work table having the measuring device being mounted thereon.

8. A tool assembly unit as set forth in claim 1 wherein said is adapted for coupling the tool and tool holder by heat shrinking.

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9. A tool assembly unit for coupling a tool and a tool holder by heat shrinking, said unit comprising:

a measuring device adapted to determine the position of the tool with respect to the tool holder;

20 an alignment device coupled to said measuring device, said alignment device being adapted to receive the tool holder;

a heating device slideably mounted on said alignment device and defining a bore for sliding the tool therethrough, said heating device adapted to be removably mounted on said tool holder for heating the tool holder;

5 a moveable rod slideably disposed on said alignment device, said rod being adapted to be coupled to the tool; and

 said rod being adapted to move said tool with respect to the tool holder to a desired position as measured by said measuring device.

10. A tool assembly unit as set forth in claim 9 wherein the tool holder
10 defines an aperture for slideably disposing said moveable rod therein.

11. A tool assembly unit as set forth in claim 9 wherein said measuring device includes an optical viewer disposed thereon.

15 12. A tool assembly as set forth in claim 11 including a controller coupled to said optical viewer and said alignment device for controlling said rod in response to feedback input by a user.

13. A tool assembly as set forth in claim 11 including a controller coupled to
20 said optical viewer and said alignment device for controlling said rod in response to feedback from said optical viewer.

14. A tool assembly unit as set forth in claim 9 including a controller coupled to said measuring device, said alignment device and said heating device for controlling each of said devices.

5 15. A tool assembly unit as set forth in claim 9 including a work table having the measuring device being mounted thereon.

16. A method for coupling a tool and a tool holder using a tool assembly unit including a measuring device coupled to an alignment device and a moveable rod
10 slideably disposed on the alignment device, said method comprising the steps of:

mounting the tool holder on the alignment device;
coupling the moveable rod to the tool;
measuring an actual relative position between the tool and tool holder;
moving the tool within the tool holder until the actual relative position of the tool
15 relative to the tool holder is equal to a desired position;
removing the tool holder and the tool from the alignment device.

17. A method as set forth in claim 16 wherein the tool holder defines an aperture, said method including the step of slideably disposing the moveable rod in the
20 aperture.

18. A method as set forth in claim 16 including the step of moving the tool

within the aperture until the actual relative position of the tool to the tool holder is equal to the desired position.

19. A method as set forth in claim 16 wherein the measurement device
5 includes an optical viewer disposed thereon for measuring the actual relative position of the tool with respect to the tool holder.

20. A method as set forth in claim 19 wherein the tool assembly unit includes a controller coupled to the optical viewer and the alignment device, said method
10 including the step of controlling the rod in response to feedback input by a user.

21. A method as set forth in claim 19 wherein the tool assembly unit includes a controller coupled to the optical viewer and the alignment device, said method including the step of controlling the rod in response to feedback from the optical viewer.

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22. A method as set forth in claim 16 wherein the tool assembly unit includes a controller coupled to the measuring device, the alignment device and the heating device for controlling each of the devices.

20 23. A method as set forth in claim 16 including the step of affixing the tool to the tool holder by heat shrinking.

24. A method for coupling a tool and a tool holder by heat shrinking using a tool assembly unit including a measuring device coupled to an alignment device having a heating device slideably mounted thereon and a moveable rod slideably disposed on the alignment device, said method comprising the steps of:

- 5 mounting the tool holder on the alignment device;
- heating the tool holder;
- coupling the moveable rod to the tool;
- measuring an actual relative position between the tool and the tool holder;
- moving the tool within the tool holder until the actual position of the tool relative
10 to the tool holder is equal to a desired position;
- cooling the tool holder to shrink the tool holder around the tool; and
- removing the tool holder and the tool from the alignment device.

25. A method as set forth in claim 24 wherein the tool holder defines an
15 aperture, said method including the step of slideably disposing the moveable rod in the
 aperture.

26. A method as set forth in claim 25 including the step of moving the tool
within the aperture until the actual relative position of the tool to the tool holder is equal
20 to the desired position.

27. A method as set forth in claim 24 wherein the measurement device

includes an optical viewer disposed thereon for measuring the actual relative position of the tool with respect to the tool holder.

28. A method as set forth in claim 27 wherein the tool assembly unit includes
5 a controller coupled to the optical viewer and the alignment device, said method including the step of controlling the rod in response to feedback input by a user.

29. A method as set forth in claim 27 wherein the tool assembly unit includes
a controller coupled to the optical viewer and the alignment device, said method
10 including the step of controlling the rod in response to feedback from the optical viewer

30. A method as set forth in claim 24 wherein the tool assembly unit includes
a controller coupled to the measuring device, the alignment device and the heating device
for controlling each of the devices.